

We are learning to find equivalent ratios and write the equivalent fractions for these.

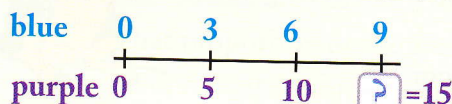


Double number lines.



$2 : 3$ and $4 : 5$ are called ratios. We read $2 : 3$ as "two to three".

Example Aroha wants to make a necklace with blue and purple beads in the ratio of $3 : 5$. How many beads must be purple if she makes nine of them blue?



15 beads must be purple.

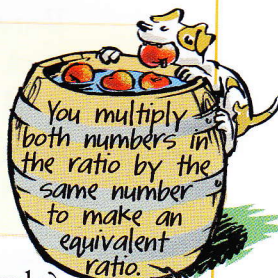
OR



There are $\frac{3}{5}$ as many blue as purple.

$$3 : 5 = 9 : 15$$

$\times 3$ (above the arrow from 3 to 9)
 $\times 3$ (below the arrow from 5 to 15)



b How many beads out of every eight will be blue and how many purple?

For every three blue beads there must be five purple beads.

So out of every eight beads,

three must be blue and five must be purple.

You can think of 8 as the "whole".



$\frac{3}{8}$ are blue.
 $\frac{5}{8}$ are purple.



Activity 2

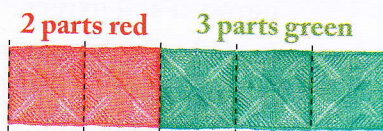
1 Neve is making a scarf with red and green wool. She wants the ratio of red to green to be $2 : 3$.

a If she knitted 40 squares of red, how many squares of green would Neve need to knit? Show how you worked out the answer.

Copy and finish this equation.

$$2 : 3 = 40 : \boxed{?}$$

b Neve correctly drew this diagram to explain why $\frac{2}{5}$ of the scarf will be red and $\frac{3}{5}$ green. Explain her thinking.



c i If 20 squares are red, how many squares must be green?

ii Copy and complete the equivalent ratio and equivalent fractions.

$$\text{red} : \text{green} = 2 : 3 = 20 : \boxed{?}$$

$$\text{fraction that is red} = \frac{2}{5} = \frac{20}{\boxed{?}}$$

$$\text{fraction that is green} = \frac{3}{5} = \frac{\boxed{?}}{\boxed{?}}$$

iii How are the numbers in the ratio and the numbers in the fractions related?



2

A  3 cm
 B  4 cm



Line A is $\frac{3}{4}$ as long as line B.

a What is the ratio of the length of line A to the length of line B?

b What goes in the gaps for these lines?

i A  4 cm
 B  7 cm

Line A is _____ as long as line B.

The ratio of the length of line A to the length of line B is _____.

ii A  3 cm
 B  5 cm

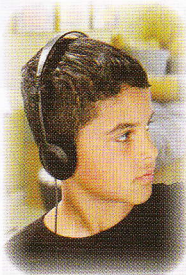
Line A is _____ as long as line B.

The ratio of the length of line A to the length of line B is _____.



3 A survey at school asked 'Do you like pop or hip hop more?'

The survey found that the ratio of *people who liked pop* : *people who liked hip hop* was 3 : 7.



a In the survey, 36 students said they liked pop more.

Copy and finish this equation to find the number who liked hip hop more. $3 : 7 = 36 : \boxed{?}$

b What *fraction* liked pop more?

What *fraction* liked hip hop more?

c What do you notice about the sum of the two fractions in **part b**? Explain why this is the case.

4 Air is made up mainly of nitrogen and oxygen in the ratio 80 : 20.

a Millee wrote down this equation for the ratio of nitrogen and oxygen. $80 : 20 = 40 : 10 = 20 : 5 = 4 : 1$

i What is the relationship between the first and last ratios?

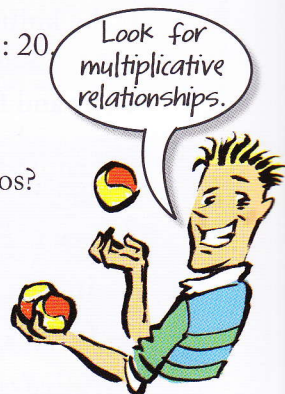
ii The ratio 4 : 1 is the ratio in its simplest form.

How could Millee have found this ratio more quickly?

b Sam wrote that air was made up of $\frac{80}{100}$ nitrogen. Is Sam correct? Explain why or why not.

c Copy and finish this equation for the fraction of nitrogen in the air. $\frac{80}{100} = \frac{\boxed{?}}{50} = \frac{\boxed{?}}{25} = \frac{4}{\boxed{?}}$

d Copy and finish this equation for the fraction of oxygen in the air. $\frac{20}{\boxed{?}} = \frac{\boxed{?}}{50} = \frac{\boxed{?}}{25} = \frac{1}{\boxed{?}}$



5 The human body is $\frac{7}{10}$ water and the rest is other substances.

a What fraction of the human body is other substances?

b What is the ratio of water to other substances?

c Gerry Brown has a mass of 140 kg. To find out how many kilograms of Gerry's mass is water, copy and finish these equations.



This is the proportion of Gerry that is water.

i $\frac{7}{10} = \frac{?}{140}$

ii $7 : ? = ? : ?$



This is the ratio of water to other substances for Gerry.

6 Sam and Millee are making fruit punch for the end of year class party.

a What proportion of the fruit punch is lemonade?

b Write the ratio of *fruit punch mix : lemonade : ginger ale*

c Sam put 1.5 litres of lemonade in a jug.

How much fruit punch mix and ginger ale would he need to put in?

d Another class decided to join with them for the party.

Now they needed 54 litres of fruit punch.

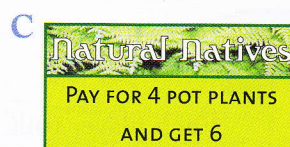
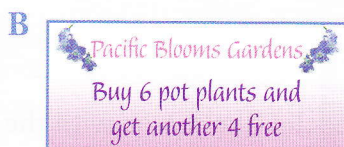
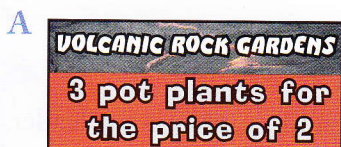
How much of each ingredient did they need to mix?

e Mira from another class has a different recipe in which the 1 part ginger ale is replaced with $\frac{1}{3}$ part of ginger ale and $\frac{1}{3}$ part of lemon juice and $\frac{1}{3}$ part of pineapple juice.

How much of each ingredient would they need to make 54 litres?



7 Which of these is the best buy? Justify your answer.



8 Challenge



a The ratio of Marama's age to her daughter Ruihi's age is 4 : 1. Marama is aged between 20 and 50.

What are all the possible ages, in full years, Marama and Ruihi could be?

b In four years time the ratio of their ages will be 3 : 1. How old will Marama and Ruihi be then?

c How old will they be when the ratio of their ages is 2 : 1?

d What is the ratio between your age and your mother's age? How old will you be when the ratio is 1 : 2?

On the marae



- 1 Whetu had some painting jobs to do on the marae.
How long will Whetu have to work to finish the jobs if he completed
- a $\frac{1}{3}$ of a job in two days? b $\frac{1}{4}$ of a job in $\frac{1}{8}$ of a day?

- 2 Huia's job was to feed the dogs.

- a If three cans of food will feed two dogs for a day, how many cans are needed to feed

- i eight dogs for a day?
ii six dogs for a day?



- b How many dogs will 63 cans feed for a week?

- 3 A hangi was set each day of a two-day festival.
The organisers had calculated that for every 20 people they needed:

8 kg potatoes

6 kg kumara

4 cabbages

7 kg chicken

3 kg pork



On the first day there were 140 people to feed and on the second, 130 people.
How much of each food would they need to put in the hangi for

- a the first day? b the second day of the festival?



Equal it up game



Two dice.

- 1 Each player rolls one die. The person with the highest number is the leader.
2 The leader rolls both dice, makes a ratio and tells it to the rest of the group.

Example Felicity rolled a 4 and a 6. She made the ratio 4 : 6

- 3 The leader makes a multiple of the first number that is less than 100.

Example Felicity gave 96 as the multiple of 4.

- 4 The first person to find the other number to make an equivalent ratio gets five points.

Example Raj said 144 because $4 : 6 = 96 : 144$. He got 5 points.

- 5 The lead passes to the left.

- 6 The winner is the person with the most points after 10 rounds.

